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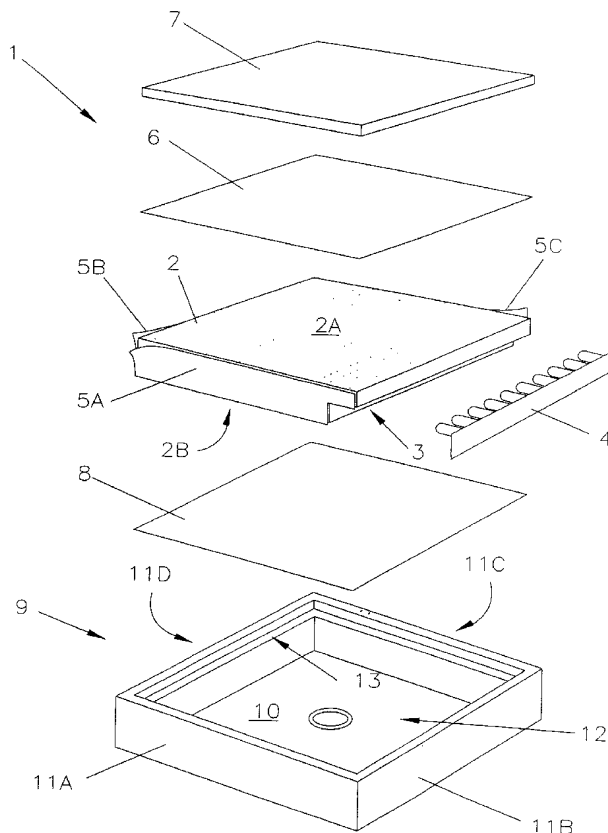
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(54) Title: LUMINOUS TILE



(57) Abstract: A luminous tile comprising a sheet of plastics material (2) which is abraded on one or both surfaces thereof (2A, 2B), a recess formed (3) along one edge of the plastics material, at least one LED (4) in the recess to edge light the plastics material, and a diffuser layer (6) on one surface of the plastics material to diffuse light emitted from the (2A) surface of the plastics material.



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## LUMINOUS TILE

This invention relates to luminous tiles.

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The present invention provides a luminous tile comprising a sheet of plastics material, said sheet of plastics material being abraded on at least one surface, a recess formed along one edge of the plastics material, at least one LED in the recess to edge light the plastics material, and a diffuser layer on one surface of the plastics material to diffuse light emitted from the surface of the plastics material.

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Preferably the diffuser layer comprises a sheet of opaque plastics.

Preferably a sheet of glass is located on the diffuser layer.

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Preferably the edges of the plastics sheet are sealed with a light reflective material such as a white tape.

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There may be an array of LEDs emitting the three primary colours, and means to control the intensity of each primary colour to create different colours of tiles.

There may be two or more rows of LEDs, and the LEDs may illuminate one or more edges of the plastics material and/or may illuminate a recess in the plastics material between its edges.

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Preferably a frame is provided for the tile. The frame may include a base and side walls extending from the base to provide a container with an open face.

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Preferably a reflective layer is provided on the side of the plastics material remote from the diffuser layer.

The frame may be mounted in a container and releasable clips may be provided to secure the tile frame in the container.

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The frame may be mounted on a wall plate and releasable clips may be provided to secure the frame to the wall plate.

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The wall plate may be adapted to receive two or more tile frames.

Artwork may be positioned between the diffuser layer and glass layer or the glass layer having artwork etched therein.

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Embodiments of the present invention will now be described by way of example with reference to the accompanying drawings in which:-

Figure 1 shows an exploded perspective view of a first embodiment of a luminous tile according to the present invention,

Figure 2 shows an exploded perspective view of a luminous tile and a frame;

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Figure 3 shows a perspective view of a luminous tile and a wall plate;

Figure 4 shows a perspective view of a modified embodiment of a tile according to the present invention, and

10      Figure 5 shows an exploded perspective view of a further modified embodiment according to the present invention.

Referring to Figure 1 there is shown a luminous tile 1 . Tile 1 has a rectangular sheet 2 of acrylic material. Sheet 2 is abraded on both faces 2A, 2B, e.g. with 20 to 40 grit sandpaper. A recess 3 is formed along one edge of the sheet 2 to accommodate an elongate array of LEDs 4. In use, LEDs 4 edge light the sheet 2. Three strips of white (and hence light reflective) tape 5A, 5B, 5C are secured to the other edges of sheet 2.

Mounted above the sheet 2 is a rectangular diffuser layer 6 formed from an opaque polycarbonate to diffuse light emitted from the surface of the sheet 2 and a rectangular sheet of glass 7 is located on the diffuser layer. A rectangular reflective layer 8 is provided on the side of sheet 2 remote from the diffuser layer 6. In this embodiment the reflective layer 8 is formed from white powder coated aluminium.

25      A rectangular frame 9 is provided for the tile to support the reflective layer 8, sheet 2 and LEDs 4, diffuser layer 6 and glass sheet 7. The frame 9 has a base 10 and side walls 11A, 11B, 11C, 11D extending from the base to provide a container with an open face 12. A rebate 13 is provided in the upper part of the walls. The reflective layer 8, sheet 2 and LEDs 4, and diffuser layer 6 are of a dimension such that they fit within the side walls below the rebate 13. The glass sheet 7 is of slightly larger dimensions and fits in the rebate 13.

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In use, the LEDs edge light the sheet 2 and light is reflected internally due to the tape 5A, 5B, 5C and abraded faces 2A, 2B to create an overall "glow" to the sheet 2. All light is reflected upwards due to reflective layer 8 which is then diffused by layer 6 to make the light emission appear uniform over the surface of the diffuser layer. The glass sheet 7 provides an aesthetic finish to the tile.

The tile of Figure 1 may be mounted on the floor, e.g. as shown in Figure 2, or on a wall, e.g. as shown in Figure 3.

Referring now to Figure 2 there is shown a luminous rectangular tile 20 mounted in a frame. The tile 20 may be identical to tile 1 shown in Figure 1 or could be a modified design of luminous tile. A container 21 is provided to receive the frame. The container 21 comprises an upper rectangular tray 22 with in aperture 22A in its base leading to smaller lower rectangular tray 23. Releasable spring clips 24A, 24B (only two shown) on one or more the side walls of tile 20 are designed to releasably engage with recesses 25A, 25B (only two shown) on the inside walls of upper tray 22. Such clips 24A, 24B secure the tile 20 to the container 21. The lower tray 23 is designed to be embedded in concrete.

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In use, an array of tiles can be mounted on the floor by abutting a plurality of containers 21 in side by side relationship with side walls of the upper tray abutting side walls of adjacent upper trays, and with the lower trays embedded in concrete or otherwise secured in position. Electrical wires for the tiles 20 can be fed through and accommodated in the lower trays 23. Tiles can then be mounted in the containers 21.

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Referring now to Figure 3, there is shown a pair of luminous rectangular tiles 30 each mounted in a frame. The tiles 30 may be identical to tile 1 shown in Figure 1 or could be a modified design of luminous tile. A wall plate 31 is mounted on a wall. As shown, the wall plate 31 is designed to support nine frames of wall tiles 30. Releasable clips, or Velcro or Dual Lock, (not shown) may be provided to secure the frames of tiles 30 to the wall plate 31.

In use, a surface of a wall can be covered with tiles by mounting one or more wall plates on the wall and an array of tiles 30 mounted on the wall plates. The wall plates may be designed to supply electrical power to the tiles.

Referring now to Figure 4, there is shown part of a luminous tile in which a sheet of plastics is illuminated by two or more rows of LEDs. In Figure 4 a rectangular acrylic sheet 40 has a pair of recesses 41A, 41B on opposing edges, and a recess 42 centrally located between the recesses 41A, 41B. Two arrays of LEDs 43A, 43B edge light sheet 40 at recesses 41A and 41B. Two arrays of LEDs 44A, 44B positioned "back to back" illuminate opposing faces 42A, 42B of recess 42. The arrangement shown in Figure 4 allows LEDs to illuminate a larger sheet. The sheet 40 may form part of a luminous tile, e.g. replacing the sheet 2 and LEDs 4 in Figure 1.

Referring now to Figure 5, there is shown a luminous tile 50 having a rectangular plastics sheet 51 of acrylic edge lit by an array of LEDs 52, a rectangular polycarbonate diffuser layer 53 on one side of sheet 51, and a glass layer 54 on the diffuser layer. Artwork, such a lettering 55 is positioned between the diffuser layer and glass layer 54. The sheet 51,

LEDs 52, diffuser layer 52, and glass layer 54 may form part of a luminous tile similar to that shown in Figure 1. Alternatively, instead of separate artwork such as lettering 55, the glass  
10 layer could have artwork etched therein.

The present invention also provides a luminous tile illuminated with an array of LEDs illuminating the three primary colours, and means to control the intensity of each primary colour to create different colours of tiles. Thus the luminous tiles described above could  
15 incorporate array/s of LEDs emitting the three primary colours.



## CLAIMS

- 10 1. A luminous tile comprising a sheet of plastics material, said sheet of plastics material being abraded on one or both surfaces thereof a recess formed along one edge of the plastics material, at least one LED in the recess to edge light the plastics material, and a diffuser layer on one surface of the plastics material to diffuse light emitted from the surface of the plastics material.
- 15 2. A luminous tile as claimed in claim 1, in which the diffuser layer comprises a sheet of opaque plastics.
3. A luminous tile as claimed in claim 1 or claim 2, in which a sheet of glass is located  
20 on the diffuser layer.
- 4 A luminous tile as claimed in any preceding claim, in which the edges of the plastics sheet are sealed with a light reflective material.
- 25 5. A luminous tile as claimed in any preceding claim, in which a reflective layer is provided on the side of the plastics material remote from the diffuser layer.
6. A luminous tile as claimed in any preceding claim, in which there is an array of LEDs emitting the three primary colours, and means to control the intensity of each primary colour  
30 to create different colours of tiles.

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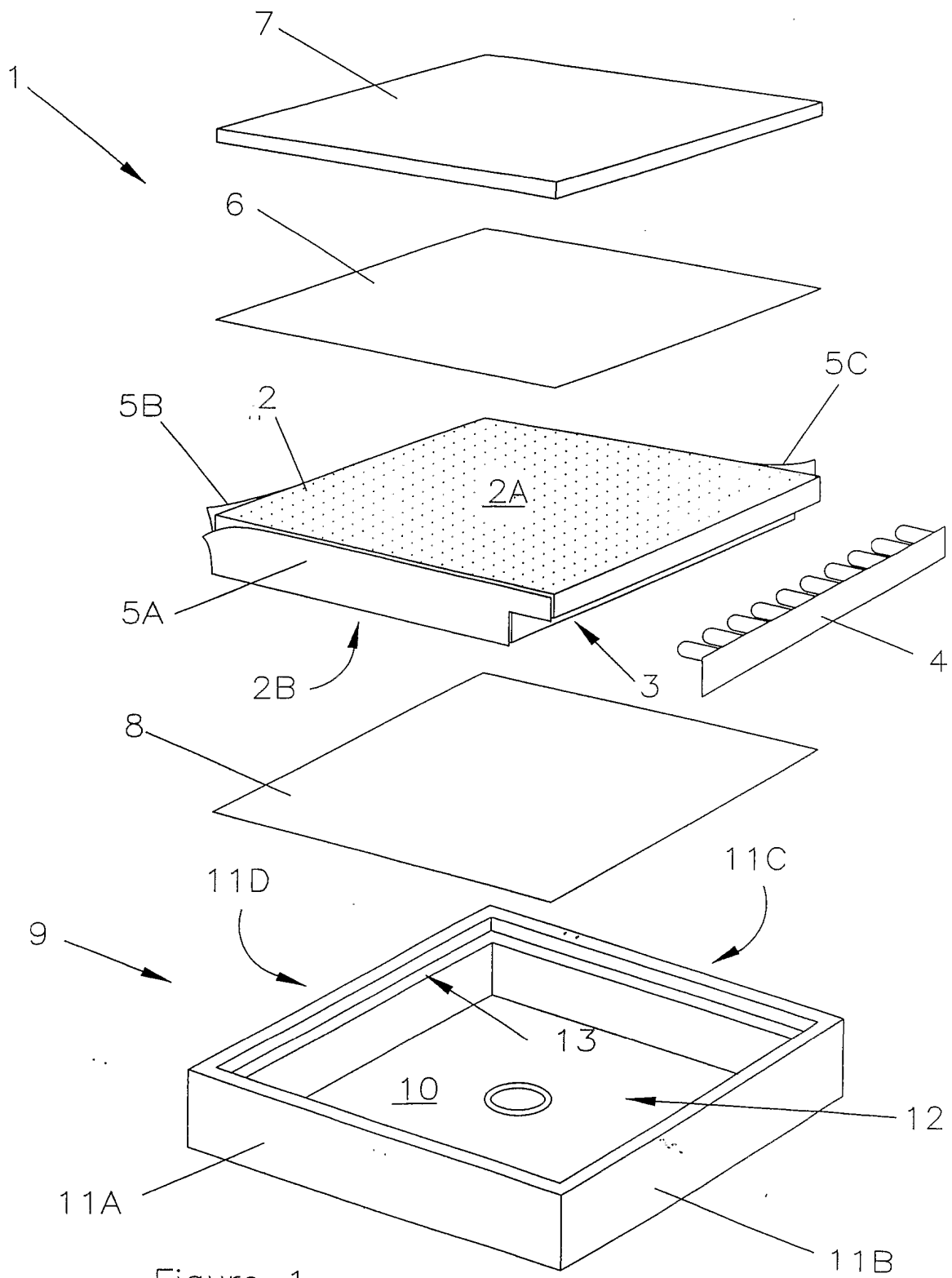
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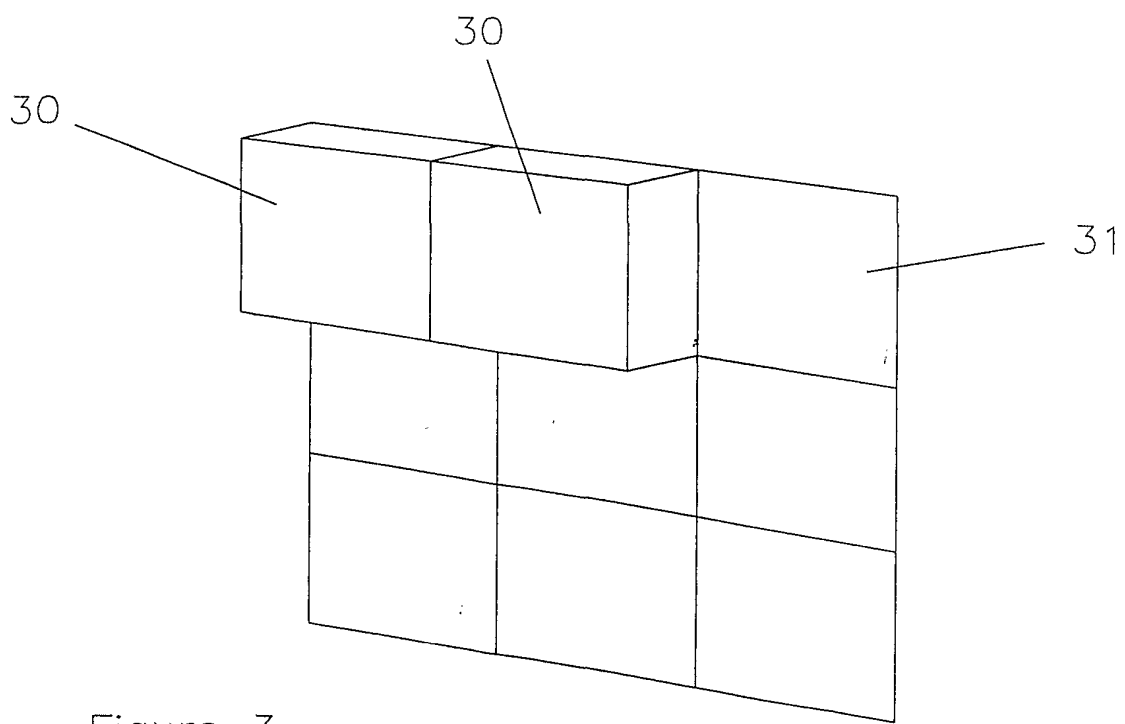
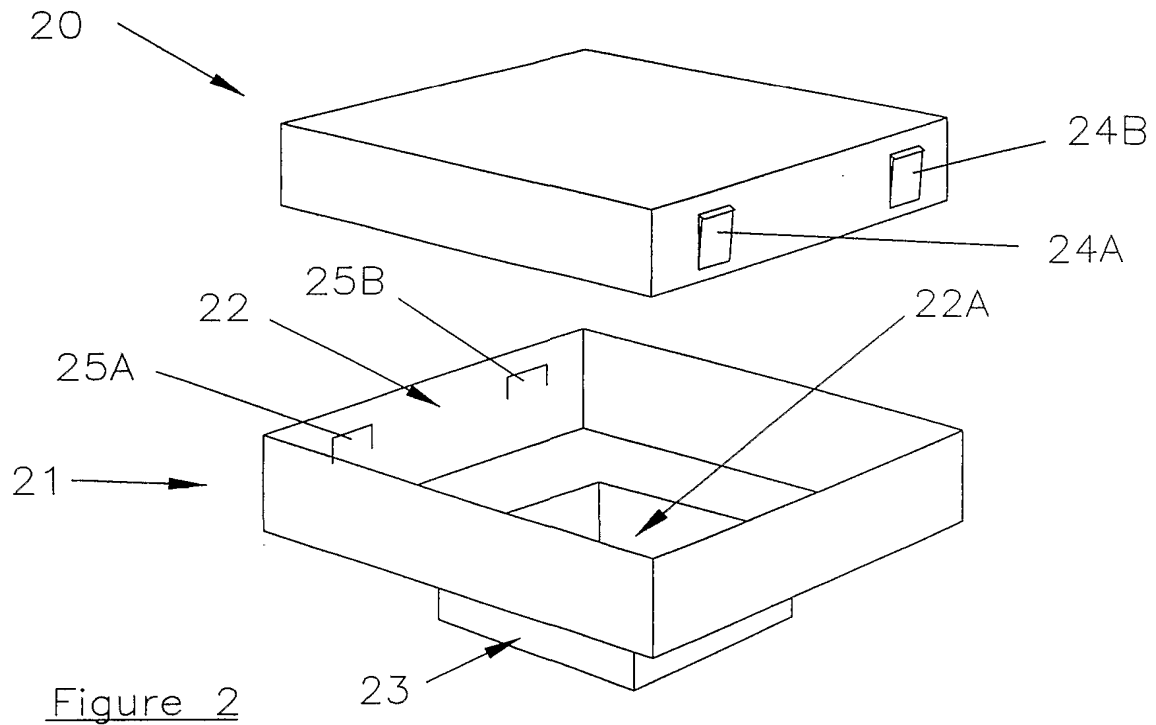
7. A luminous tile as claimed in any preceding claim, in which there are two or more rows of LEDs, and the LEDs may illuminate one or more edges of the plastics material and/or may  
10 illuminate a recess in the plastics material between its edges.

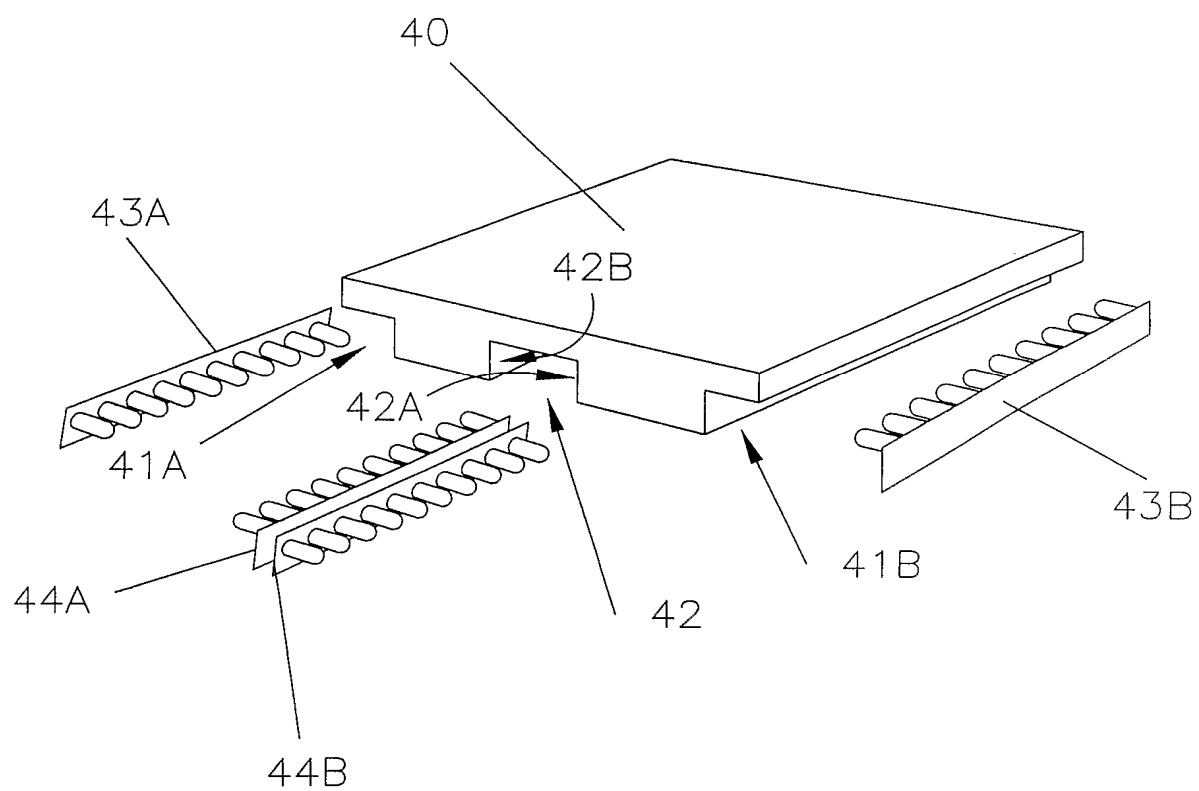
8. A luminous tile as claimed in any preceding claim, including a frame for the tile, the frame including a base and side walls extending from the base to provide a container with an open face.  
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9. A luminous tile as claimed in claim 1, in which the frame is mounted in a container or on a wall plate and releasable clips may be provided to secure the tile frame in the container.

10. A luminous tile as claimed in any preceding claim, in which artwork is positioned  
20 between the diffuser layer and glass layer or the glass layer has artwork etched therein.

Figure 1



Figure 4

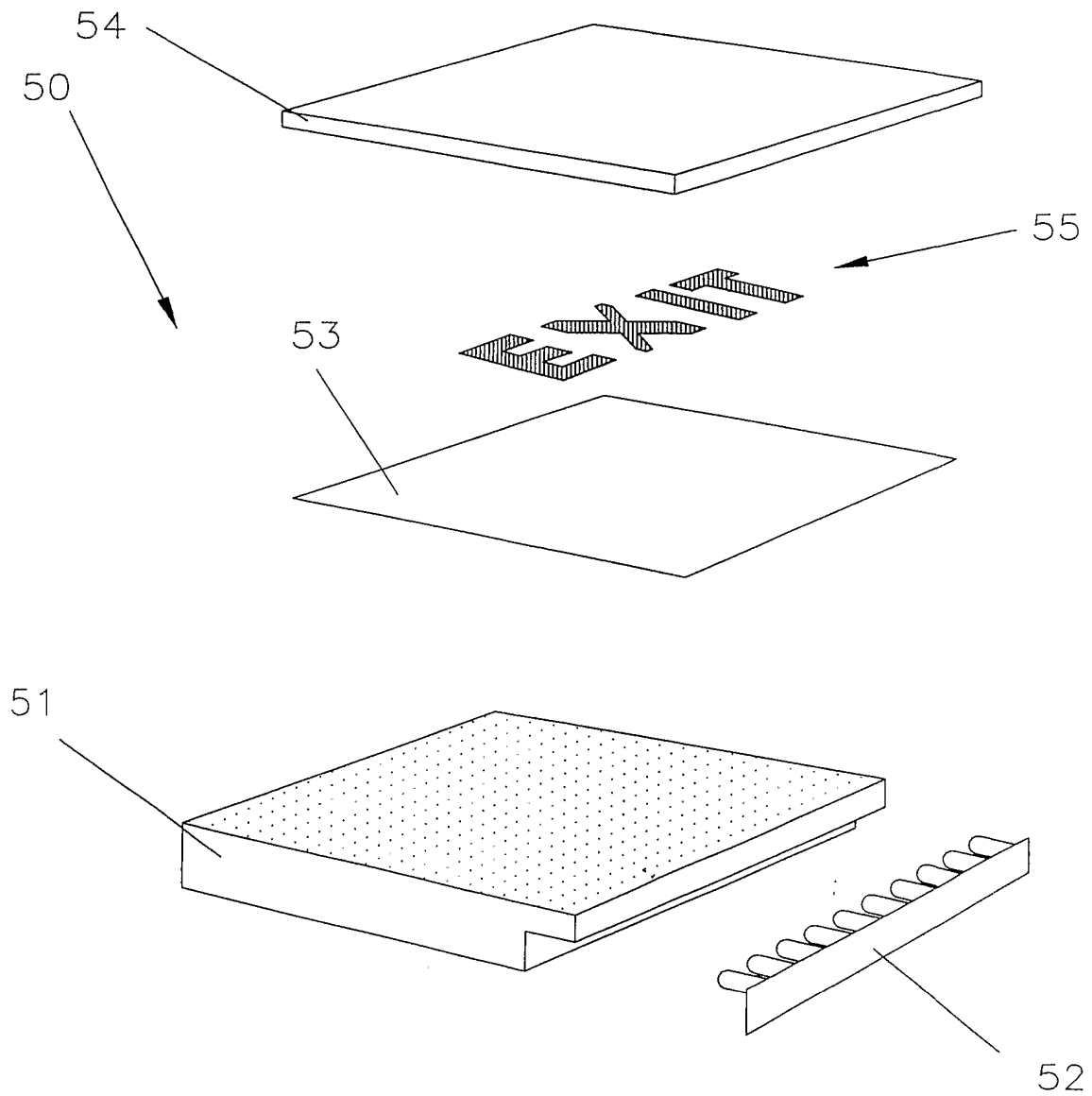


Figure 5

## INTERNATIONAL SEARCH REPORT

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## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 F21S8/02 F21V8/00 E04B5/46 E04F13/08

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 01 21909 A (RUSSELL MICHELLE EVELYN ;RUSSELL MICHAEL GULVIN (GB)) 29 March 2001 (2001-03-29) abstract page 3, line 13 -page 5, line 19 page 6, line 14 -page 7, line 20 figures 1-4	1-10
Y	GB 2 030 750 A (PIERRE LO INTERNATIONAL LTD) 10 April 1980 (1980-04-10) abstract page 1, line 94 -page 2, line 3 figures 4,5	1-10

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

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- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

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- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

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